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371. *By Prof. E. B. Seitz.*—ACB is the quadrant of a circle, O the center of its inscribed circle; O_1, O_2, O_3, . . . O_n are the centers of a series of circles, each of which touches the preceding, the arc AB and the radius AC, the circle O_1 touches the circle O; and OH, O_1H_1, O_2H_2, . . . O_nH_n are the perpendiculars on AC, or the radii of the inscribed circles. If $AC=r$, $O_nH_n = x_n$, and $CH_n : O_nH_n = u_n$, prove that

$$u_n = \tfrac{1}{2}(\sqrt{2}+1)^{2n+1} - \tfrac{1}{2}(\sqrt{2}-1)^{2n+1},$$

$$x_n = \frac{2r}{2+(\sqrt{2}+1)^{2n+1}+(\sqrt{2}-1)^{2n+1}}.$$

372. *By William Hoover, A. M.*—A hemisphere, radius r, is resting with its convex surface on two planes, one perfectly smooth and inclined to the horizen at an angle α, the other being inclined at an angle β; if m be the coefficient of friction between the latter and the hemisphere, what is the position for rest?

373. *Selected by Prof. Eddy.*—Two particles of masses m and m' respectively, are connected by a string passing through a small fixed ring and are held so that the string is horizontal; their distances from the ring being a and a', they are let go. If ρ and ρ' be the initial radii of curvature of their paths, prove that

$$\frac{m}{\rho} = \frac{m'}{\rho'}, \text{ and } \frac{1}{\rho}+\frac{1}{\rho'} = \frac{1}{a}+\frac{1}{a'}.$$

374. *By R. S. Woodward.*—Prove 1st, that the probable error of any tabular value in a table of logarithms, trigonometric functions etc., is 0.25 of a unit of the last decimal place, supposing this place correct to the nearest unit; 2nd, that the average of the squares of probable errors of interpolated values depending on first differences only is $\frac{2}{3}(0.25)^2$.

ANNOUNCEMENT OF VOL. IX.—As this No. completes the 8th annual volume of the ANALYST, we are pleased to say to our readers that we have no thought of abandoning the publication, so long as we continue to receive the support and encouragement of the many able mathematicians who give character to our publication by their contributions to its pages.

The publication of the ANALYST was commenced with no exalted expectations of success, as the history of like publications in this country attests the difficulty of sustaining a periodical devoted exclusively to severe and exact scientific research.

It is therefore with some degree of gratification that we are able to state that the publication has been thus far conducted without pecuniary loss.

Though our subscription list is not large yet an examination of the published volumes will show that we number among our contributors many of the ablest mathematicians and astronomers in America, besides several eminent Europeans. And it is with considerable satisfaction that we have been able to present to our readers eight annual volumes made wholly of original contributions, with a few translations. For this we take no praise to ourself but freely acknowledge our indebtedness to our learned and liberal subscribers.

We shall commence the ninth volume of the ANALYST, therefore, with confidence that the friends who have thus far stood by us will continue their patronage and support, and that many new names will be added to our list of subscribers and contributors to Vol. IX.

J. E. HENDRICKS.

PUBLICATIONS RECEIVED.

A Treatise on the Calculus of Variations. By LEWIS BUFFETT CARLL, A. M. 8vo. 568 pp. New York: John Wiley & Sons. 1881.

In this volume the author has presented, in concise and elegant style, all the important applications that have been made of this abstruse branch of analysis, and has illustrated the several principles which embody the science by the discussion of 71 special problems.

The publishers have manifested their appreciation of the permanent value of this book by the superior paper and faultless typography in which it is brought out.

An Elementary Treatise on the Integral Calculus, Founded on the Method of Rates, or Fluxions. By WILLIAM WOOLSEY JOHNSON, Professor of Mathematics at the United States Naval Academy, Annapolis, Maryland. 228 pp. 8vo. New York: John Wiley & Sons. 1881.

The author of this book is so well known to the readers of the ANALYST that any commendation by us would be superfluous. We need only say that the elements of the Integral Calc. are here presented with the clearness and elegance that are characteristic of the author.

On Binomial Congruences: comprising an Extension of Fermat's and Wilson's Theorems, and a Theorem of which both are Special Cases. By O. H. MITCHELL, Fellow of the Johns Hopkins University. Reprinted from the American Journal of Math., Vol. III.

On the Ratio between Sector and Triangle in the Orbit of a Celestial Body. By ORMOND STONE. Reprinted from the American Journal of Mathematics, Vol. III.

ERRATA.

On page 147, line 14, for "and radius" read and squared radius.
" " 174, " 6 from bottom, for "Prop. II." read Props. I. and II.
" " 175, *dele* the *s* contiguous to the line $n'q$ in the Fig.
" " 190, line 8, for "t = time of" read t = half time of.
" " " , " 19, " "primative" read primitive.
" " " , " 5 from bottom, for "$N_1 = 29.732$", read $N_1 = 29.598$.